STATE OF ILLINOIS

ILLINOIS COMMERCE COMMISSION

NORTH SHORE GAS COMPANY	:	
	:	No. 11-____
Proposed General Increase	:	
In Rates For Gas Service	:	

Direct Testimony of

KEVIN R. KUSE

Senior Load Forecaster
Integrys Business Support, LLC

On Behalf of
North Shore Gas Company

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I. INTRODUCTION AND BACKGROUND

A. Identification of Witness

Q. Please state your name and business address.

A. My name is Kevin R. Kuse. My business address is Integrys Energy Group, Inc. ("Integrys"), 700 North Adams Street, P.O. Box 19001, Green Bay, WI 54307-9001.

Q. By whom are you employed and in what capacity?

A. I am a Senior Load Forecaster in the Budgets and Forecasts Department of Integrys Business Support, LLC ("IBS"), a wholly-owned subsidiary of Integrys.

Q. For whom are you providing testimony?

A. I am providing testimony for the North Shore Gas Company ("North Shore"), which is a wholly-owned indirect subsidiary of Integrys.

B. Purpose of Testimony and Summary of Conclusions

Q. Mr. Kuse, what is the purpose of your testimony?

A. The purpose of my testimony is to present North Shore's customer demand forecast for the 2012 test year, and to explain how that forecast was derived. I also will compare demand between North Shore's forecasted 2012 test year and North Shore's last comparative year, which is made up of 2010 actual weather normalized demand from January 2010 – June 2010 and forecasted demand from July 2010 – December 2010. Based on its regression analyses, North Shore forecasts 2012 customer demand of 34.9 billion cubic feet ("Bcf") of natural gas as compared to 34.8 Bcf in comparative year 2010.

C. Background and Experience

Q. Please briefly outline your educational background.

A. I hold a Bachelor of Arts Degree in Economics and a Master of Science Degree in Administrative Science, both from the University of Wisconsin – Green Bay.

Q. Please summarize your business experience.

A. In February 1993, I was hired by St. Norbert College in De Pere, Wisconsin as the Director of Research and Records in the Office of Institutional Advancement. In September 1996, I was hired as a Business Evaluation Analyst by the Development Division of the Oneida Indian Tribe of Wisconsin. In September 1999, I was hired by Wisconsin Public Service Corporation, a wholly-owned subsidiary of Integrys, as a Customer Research Analyst in the Market Research Department. From September 1999 to July 2007, I developed customer insights by gathering and interpreting data from primary survey research and secondary data sources. During that period I also performed two short term assignments as the Leader of the Market Research department. In July 2007, I became a Senior Load Forecaster in the Budgets and Forecasts Department of IBS.

Q. What are your current duties and responsibilities?

A. As a Senior Load Forecaster my duties include the performance of various aspects of short-term and long-term electric and gas forecasts.

Q. Have you previously testified before any regulatory agency?

A. Yes, I have. I have provided written testimony to the Michigan Public Service Commission in Case No. U-16166, which was the most recent general rate case of Upper Peninsula Power Company, a wholly-owned subsidiary of Integrys.

II. GAS SALES FORECAST METHODOLOGY

A. Forecast of Customer Demand

Q. In general, how did North Shore used to forecast customer demand for the 2012 test year?

A. We did so by performing regression analyses for each Service Classification ("S.C.") to measure each customer segment's sensitivity to certain explanatory variables (e.g., weather, price, estimated efficiency improvements, and socioeconomic trends) that affect the segment's natural gas usage.

Q Please describe North Shore's current Service Classifications.

A. North Shore's customers are currently divided among four Service Classifications. The customers in S.C. No. 1 (Small Residential Service) and S.C. No. 2 (General Service) are classified as "firm general." For test year 2012, North Shore forecasts 158,777 firm general customers. The 26 customers in S.C. No. 3 (Large Volume Demand Service) and S.C. No. 4 (Contract Service to Prevent Bypass) are classified as "large volume customers." For the 2012 test year we expect North Shore to have one S.C. No. 6 (Contract Service Electric Generation) customer that is currently taking service under S.C. No. 2. This customer is included in S.C. No. 2 in the "allocation base period" described on page 11.

Q. How did North Shore determine its forecasted total demand?

A. I will first describe the regression analysis used to calculate large volume customer demand, and then I will describe the regression analysis used to determine the forecast of firm general demand.

Q. Please describe the methodology used to determine the large volume customer demand forecast for the 2012 test year.

A. There were a number of steps in the forecast process for large volume customer demand. First, monthly demand for S.C. Nos. 3 and 4 were summed. Second, adjustments were made to demand based on customer movement between Service Classifications. This ensured that the historical data is consistent with current large volume customer demand. Finally, a regression analysis was performed to forecast the long-term trend in large volume customer total demand.

Q. Please describe the regression analysis used to determine the firm general demand forecast for the 2012 test year.

A. This analysis also had a number of steps. Demand was first divided into S.C. No. 1 and S.C. No. 2 demand. Each of these two classifications was further divided into demand by non-heating customers and demand by heating customers. Adjustments were then made to demand based on customer movement between Service Classifications in order to ensure that the historical data and current firm general customer demand were comparable. Finally, demand was divided into number of customers and usage per customer. This disaggregation of firm general demand provided the following eight components, which were forecasted independently on a monthly basis:

1) Usage per non-heating S.C. No. 1 customer

2) Number of non-heating S.C. No. 1 customers

3) Usage per heating S.C. No. 1 customer

4) Number of heating S.C. No. 1 customers

5) Usage per non-heating S.C. No. 2 customer

6) Number of non-heating S.C. No. 2 customers

7) Usage per heating S.C. No. 2 customer

8) Number of heating S.C. No. 2 customers

The firm general demand was divided into these various components because various economic, demographic and weather factors affect each component of firm general demand differently. By examining each of the eight components, and relating them to those factors, a greater understanding is gained of how these factors affect firm general demand.

Q. Can you explain the gas forecast model in more detail?

A. Yes. The S.C. No. 1 Heating forecast uses two regression models, a number-of-customers model and a use-per-customer model. Both are monthly models and each was run with historical monthly data from January 2003 to February 2010. The use-per-customer model is a regression using multiplicative variables developed by Itron[1] representing Heating and Other gas usage. Itron calls this a Statistically Adjusted End-Use ("SAE") model. This model makes use of billing heating degree days ("HDD"), appliance saturation and efficiencies, home size (people per household), trends based on

[1] Itron is a technology provider to energy and water industries worldwide that developed both the multiplicative variables and the SAE regression model. Itron provides technology regarding metering, meter data collection, energy information management, load forecasting, analysis and consulting services to over 3,000 utilities. MetrixND is a statistical forecasting software tool used for short-term and long-term energy and demand forecasting. Itron's MetrixND has more than 700 users from 160 utilities and energy companies in nine countries.

U.S. Energy Information Administration ("EIA") data, real personal income, and real price to the customer. The SAE methodology will be explained in more detail below.

The total S.C. No. 1 Heating sales forecast is a combination of the use-per-customer model and the number-of-customer forecasts.

Q. Please explain in more detail how the SAE models are used in the use-per-customer models.

A. Using the S.C. No. 1 Heating forecast model as an example, the model design considers billing sales, price, structural changes, and appliance saturation and efficiencies trends. It then imposes a model structure through the SAE specification.

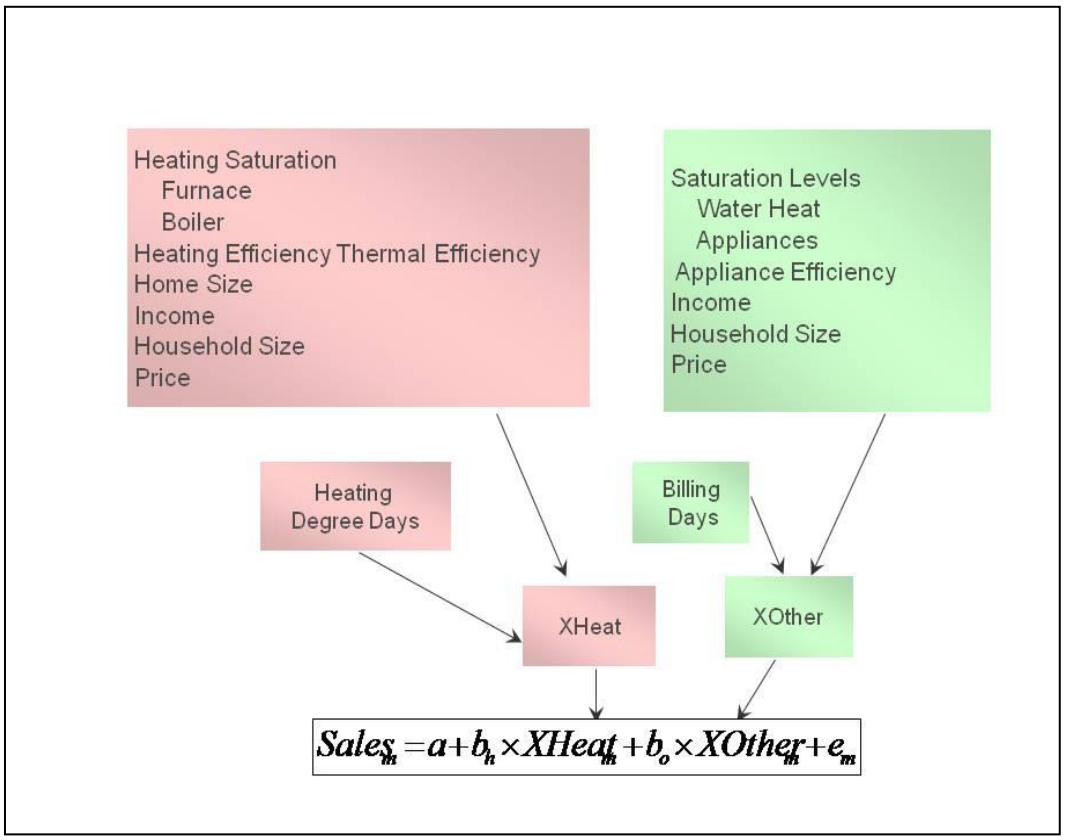
Instead of constructing a regression model with many explanatory variables, this approach constructs a model with two high-level end-use variables: Heating and Other Use. The model structure then embeds forecast drivers into these two constructed variables. The forecast drivers include HDD, price, income, household size (people per household), and end-use saturation and efficiency trends.

The estimated average use per customer regression model using the constructed end-use variables is:

$$AvgUse_t = B_0 + B_1 XHeat_t + B_2 XOther_t + e_t$$

The SAE model structure incorporates consumers' behavior in response to changes in various explanatory variables (elasticity). Customer behavior is based on research performed by Itron. By focusing on consumers' behavior in response to various changes in price, heating, cooling, income, etc. (explanatory variables), North Shore can capture the appropriate impacts of changes in economic conditions and how they interrelate with end-use variables.

The graphic below explains in more detail the economic and various end-use saturation and efficiency variables, developed from the EIA energy efficiency forecasts, which make up the main explanatory variables:



The XHeat variable has two components:

$$XHeat_{y,m} = HeatIndex_y \times HeatUse_{y,m}$$

HeatIndex is expanded below:

$$HeatIndex_y = Structural\ \ Index_y \times \sum_{Type} Weight^{Type} \times \frac{\left(Sat_y^{Type} / Eff_y^{Type} \right)}{\left(Sat_{01}^{Type} / Eff_{01}^{Type} \right)}$$

HeatUse is expanded below:

$$HeatUse_{y,m} = \left(\frac{HDD_{y,m}}{HDD_{01}}\right) \times \left(\frac{HHSize_{y,m}}{HHSize_{01}}\right)^{a} \times \left(\frac{Income_{y,m}}{Income_{01}}\right)^{b} \times \left(\frac{\text{Price}_{y,m}}{\text{Price}_{01}}\right)^{c}$$

Factors Impacting Heat Use or XHeat:

1. Non-weather-sensitive end-use saturation and efficiency trends,
2. Number of billing days,
3. Household size and income, and
4. Prices.

Q. Has North Shore used this model in the past to forecast firm general demand?

A. Yes.

Q. How has the model performed historically?

A. The model has performed well historically. The two types of equations – use per customer and number of customers – have different characteristics and their statistical reliability is quite high.

B. Use-Per-Customer Equations

Q. Please discuss the statistical reliability of the use-per-customer equations.

The statistical reliability of the use per customer equations is first measured with the coefficient of determination, or R^2. The R^2 measures the proportion or percentage of the total variation in use per customer that is explained by the regression model. The following table shows the R^2 for each equation in comparative year 2010. Approximately 96 percent of the total variation in North Shore's use per customer is explained by the regression models.

NSG Use/Customer (S.C. Nos. 1-2) and Total Demand (S.C. Nos. 3-4)		
	Adjusted R-squared	**Percentage of Demand**
S.C. No. 1 Heating	99.5%	53.4%
S.C. No. 1 Non-heating	90.7%	0.1%
S.C. No. 2 Heating	99.2%	26.1%
S.C. No. 2 Non-heating	95.2%	0.8%
S.C. Nos. 3-4 (Total Demand)	82.7%	19.6%
Weighted Average	96.1%	100.0%

C. Number of Customers Equations

Q. Please discuss the statistical reliability of the number-of-customer equations.

A. The statistical reliability of the number of customers equations is first measured with the R^2. The following table shows the R^2 for each equation along with the percentage of actual demand in 2009. Approximately 98 percent of the total variation in North Shore's number of customers is explained by the regression models.

NSG Number of Customers Equations		
	Adjusted R-squared	**Percentage of Demand**
S.C. No. 1 Heating	98.6%	53.4%
S.C. No. 1 Non-heating	99.5%	0.1%
S.C. No. 2 Heating	98.5%	26.1%
S.C. No. 2 Non-heating	87.2%	0.8%
S.C. Nos. 3-4 (Total Demand)	94.0%	19.6%
Weighted Average	97.6%	100.0%

Q. What general assumptions were made in developing the total demand forecast?

A. The following assumptions were made:

- For Heating S.C. Nos. 1 and 2, normal weather based on the twelve-year period 1998-2009 was used.[2] This equals 6,016 Heating Degree Days (HDD) for non-leap years and 6,036 HDD for leap years.
- Economic information is from the February 2010 Moody's Analytics forecast for North Shore.
- EIA efficiency and saturation forecast was provided by Itron.
- Price information was from NYMEX Short-Term Forecast dated March 3, 2010.

Q. Based on these analyses, what level of customer demand does North Shore forecast for test year 2012?

A. North Shore forecasts firm general demand of 27.8 Bcf and large volume customer demand of 7.1 Bcf, for a total of 34.9 Bcf in test year 2012.

Q. Was the demand forecast further allocated?

A. Yes. The five classifications from the forecast of annual firm general demand volumes and customers were further divided into the following customer categories by month for volume blocking and revenue forecasting purposes. This approach determined monthly and annual volumes by Service Classification, revenue class (residential, commercial, and industrial), heating / non-heating, and sales type (retail and transport). The subgroups were:

[2] The HDD using a 12 year normal was required by the Commission's Final Order in ICC Docket Nos. 07-0241/0242 consol. In ICC Docket Nos. 09-0166/0167 consol., North Shore witness Mr. Brian Marozas recommended 6,095 HDD based on 1996-2007 data, and this issue was not contested.

Service Classification No. 1 Heating Forecast			
S.C. No. 1	Heating	Retail	Residential
S.C. No. 1	Heating	Transport	Residential

Service Classification No. 1 Non-heating Forecast			
S.C. No. 1	Non-heating	Retail	Residential
S.C. No. 1	Non-heating	Transport	Residential

Service Classification No. 2 Heating Forecast			
S.C. No. 2	Heating	Retail	Residential
S.C. No. 2	Heating	Transport	Residential
S.C. No. 2	Heating	Retail	Commercial
S.C. No. 2	Heating	Transport	Commercial
S.C. No. 2	Heating	Retail	Industrial
S.C. No. 2	Heating	Transport	Industrial

Service Classification No. 2 Non-heating Forecast			
S.C. No. 2	Non-heating	Retail	Residential
S.C. No. 2	Non-heating	Transport	Residential
S.C. No. 2	Non-heating	Retail	Commercial
S.C. No. 2	Non-heating	Transport	Commercial
S.C. No. 2	Non-heating	Retail	Industrial
S.C. No. 2	Non-heating	Transport	Industrial

Service Classification No.s 3+ Forecast			
S.C. No. 3	Heating	Retail	Residential
S.C. No. 3	Heating	Transport	Residential
S.C. No. 3	Heating	Retail	Commercial
S.C. No. 3	Heating	Transport	Commercial
S.C. No. 3	Heating	Retail	Industrial
S.C. No. 3	Heating	Transport	Industrial
S.C. No. 4	Heating	Transport	Industrial

Service Classification No.s 3+ Forecast			
S.C. No. 3	Non-Heating	Retail	Residential
S.C. No. 3	Non-Heating	Transport	Residential
S.C. No. 3	Non-Heating	Retail	Commercial
S.C. No. 3	Non-Heating	Transport	Commercial
S.C. No. 3	Non-Heating	Retail	Industrial
S.C. No. 3	Non-Heating	Transport	Industrial

Q. What was the basis of the allocation to the subgroups?

A. The basis was historical sales by subgroup from 2009 actual sales volumes ("allocation base period"). The sales forecast was allocated based on the allocation base period percentages. For 2012 test year we expect North Shore to have one S.C. No. 6 (Contract Service Electric Generation) customer that is currently taking service under S.C. No. 2. This customer is included in S.C. No 2 in the allocation base period.

Q. Were there any further allocations of the sales volume forecast?

A. Yes. Sales volumes for S.C. Nos. 1 and 2 were allocated to the rate blocks (set amount or block of usage) using the monthly ogive curves (cumulative line graphs) developed from the billed frequency data for each of the S.C. Nos. 1 and 2 customer classifications. These data are stored in the Revenue Forecasting Model ("RFM"), which blocked each

month's volumes individually for all S.C. No. 1 and S.C. No. 2 sub-groups by using the corresponding sub-group and months' ogive curves from the base period.

III. COMPUTATION OF REVENUES BASED ON FORECAST

Q. Did North Shore use any other billing determinants besides volumes for revenue forecasting?

A. Yes.

Q. Please identify these other billing determinants and discuss how they were determined.

A. The other billing determinants are as follows:

- Billing Periods: Base time period (January through December 2009) ratio of the number of billing periods to the number of customers × the forecast number of customers. S.C. No. 2 billing periods were further allocated to small, medium and large meter classes based on the most recent two months' average (May 2010 and June 2010) average billing periods.
- Demand Volume: Most recent two months' average demand volumes. S.C. No. 3 only.
- Standby Service Volume: Most recent two months' average standby service volumes. S.C. No. 3 only.
- Standby Demand Volume: Most recent two months' average standby demand volume. Transportation only.
- Standby Commodity Volume: Base period standby commodity volume percentage × transportation volume forecast. Transportation pool/contract only.

- ABGC Volume: All S.C. No. 1 transportation volume + base period S.C. No. 2 ABGC volume ratio × S.C. No. 2 transportation volume forecast. Transportation only.
- Demand Devices: Most recent two months' average demand device units. S.C. No. 2 transportation only.
- Number of 2nd Pulse Units: Most recent two months' average number of 2nd pulse units.
- Number of Transportation Contract Accounts: Most recent month's (June 2010) number of transportation contract accounts. Transportation only.
- Number of Transportation Pool Accounts: Most recent month's number of transportation pool accounts and adjusted monthly for changes in number of transportation accounts. Transportation only.
- Number of Pools: Most recent month's number of pools. Transportation only.
- Number of Trades: Base period average. Transportation pool/contract only.
- Transportation Storage Credit: Most recent two months' average transportation credit unit. Transportation only.
- Number of Supplier Billing Option Credit Units: Most recent month's data.
- Storage and Balancing Volume: Contract volume. Transportation pool/contract only.

Q. What was done next?

A. Revenues were calculated in the RFM.

Q. How does the RFM calculate revenues?

A. The RFM applies applicable rates to each billing determinants to calculate various revenues by month for all sub-groups. Specific revenue items, applicable billing determinants and rates are as follows:

- Customer charge = number of billing periods × applicable customer charge rates.
- Demand charge = demand volumes × demand rate.
- Standby service charge = standby service volumes × standby service rate.
- Demand device charge = number of demand devices × demand device rate.
- Distribution charge =volumes in each block × applicable distribution charge rates.
- Rider Volume Balancing Adjustment (Rider VBA) charge = volumes × forecasted Rider VBA rates.
- Franchise Cost Adjustment (Rider FCA) charge = number of billing periods × forecasted Rider FCA rate.
- 2nd pulse device charges = number of 2nd pulse devices × 2nd pulse rate.
- Transportation contract administrative charge = number of transportation contract accounts × transportation contract administrative charge rate.
- Transportation pool administrative charge = number of transportation pool accounts × applicable transportation pool account administrative charge rates, plus number of transportation pools × transportation pool administrative charge rate.
- Transportation balancing trade charge = number of trades × trade charge rate.
- Transportation storage credit = transportation credit volumes × applicable storage credit rates.
- Rider Supplier Billing Option (Rider SBO) credit = number of accounts forecast for supplier billing option × supplier billing option rate.

- Storage and balancing base rate revenue = storage and balancing volume × storage and balancing rates.
- Energy efficiency and On-bill financing (Rider EOA) charges = number of billing periods × forecasted Rider EOA rates.
- Environmental activities (Rider 11) charge = volumes × forecasted rider 11 rates).
- Rider Uncollectable Expense Adjustment (Rider UEA) charge = number of billing periods × forecasted Rider UEA.
- Renewable Energy Resources Fund charge = number of billing periods × applicable rates.
- Low Income Energy Assistance Fund charge = number of billing periods × applicable rates.
- Retail Gas Charge Revenue = Retail gas sales volume × forecasted retail gas charge rates.
- Standby Demand Gas Charge Revenue = Standby demand volume × forecasted standby demand gas charge rates.
- Standby Commodity Gas Charge Revenue = Standby commodity volume × forecasted standby commodity gas charge rates.
- ABGC Gas Charge Revenue = ABGC volume × forecasted ABGC rates.
- Add-on Revenue Taxes = Taxable revenue × applicable add-on tax rates.
- Gas Use Taxes = Transportation volume × taxable therm percentage × applicable gas use tax rates.

Q. How were the various rates determined?

A. The North Shore tariff provided the rates for many of the base rate revenues and Regulatory Services provided the forecasted rates for various riders and gas charge revenues based on forecasted billing determinants and/or forecasted costs or revenues.

IV. COMPARISON OF COMPARATIVE YEAR DEMAND AND FORECASTED DEMAND

Q. Please compare the 2012 test year demand forecast to the comparative year 2010 (6 months actual and 6 months forecast) demand.

A. The comparative year 2010 demand is based on actual weather normalized demand (based on 6,030 HDD) from January 2010 to June 2010 and forecasted demand for July through December 2010. The forecasted for the last six months of 2010 is the same forecast used for 2012 test year and is based on 6,016 HDD for non leap years and 6,036 for leap years.

NSG Test Year Ending December 31, 2012 (Therms)

Line No	Present Rate Classification	Fiscal Year 2010	Weather Adjustments	Normalized Fiscal Year 2010	Test Year 2012	Difference	Annualized % Change	Line No
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	
						(E-D)	(F/D)/2	
	Sales and Transportation							
1	Company Use	210,000		210,000	207,000	-3,000	-0.7%	1
2	S.C. No. 1	184,115,000	770,000	184,885,000	181,939,000	-2,946,000	-0.8%	2
3	S.C. No. 2	111,022,000	1,128,000	112,150,000	95,588,000	-16,562,000	-7.4%	3
4	S.C. No. 3	30,623,000		30,623,000	50,742,000	20,119,000	32.8%	4
5	S.C. No. 4	20,149,000		20,149,000	20,325,000	176,000	0.4%	5
6	S.C. No. 5	-2,000		-2,000	0	2,000	-50.0%	6
7	**Total Volumes**	**346,117,000**	**1,898,000**	**348,015,000**	**348,801,000**	**786,000**	**0.1%**	7

The declining annualized percent change from 2010 to 2012 for S.C. No. 1 is due primarily to declining usage due to energy efficiency gains per the Energy Information Administration's projections. The decline for S.C. No. 2 is a result of customers moving to S.C. No. 3 and declining usage due to energy efficiency. The increase in large volume customer sales in S.C. No. 3 is due to customers moving from S.C. No. 2.

Q. Does this conclude your direct testimony?

A. Yes, it does.